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EXAMINER

HUYNH, YENNHU B

ART UNIT PAPER NUMBER

2813

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,942

Applicant(s)

BASCERI, CEM

Examiner

Yennhu B Huynh

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 43-47, 49-51, 53, 54 and 58-65 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

- 6) ☒ Claim(s) 43-47, 49-51, 53, 54 and 58-65 is/are rejected.

- 7) ☐ Claim(s) _____ is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.

- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)

- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

- 5) ☐ Notice of Informal Patent Application (PTO-152)

- 6) ☐ Other:

DETAILED ACTION

This Office Action is in response to the Amendment filed on 7/30/03

Claims 1-42, 48,52 & 55-57 are cancelled by Amendment filed on 2/3/03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 43,51,53,54, 58-63 are rejected under 35 U.S.C. 102(e) as being anticipated by Suh (U.S. 6,338,970).

Suh discloses a ferroelectrics capacitor of semiconductor device, which include:

-Re. Claim 43,53,54, 58, 59 & 61-63: first capacitor electrode 21; a perovskite type dielectric material comprising a first layer 22 proximate the first electrode; a second layer 23 again the first layer and further from the first electrode than the first layer, the second layer having a different amount of crystalline than the first layer (col.2, lines 17-31), perovskite type material comprising barium, strontium, titanium and oxygen has the same chemical composition through out both the first and second layer(Abstract, col. 2, lines 8-31 and col.2 & 3 lines 52-18) ; a second capacitor electrode 24 over the

Art Unit: 2813

perovskite type dielectric material (col.3, lines 19-23); wherein the first capacitor electrode 11 comprises a metal and platinum material (col.1, lines 20-28).

-Re. claim 51: wherein the perovskite type material has material has the same chemical composition of $(\text{Sr,Bi})\text{Ta}_2\text{O}_9$ in the first and second layer.

-Re. claim 60: wherein the first and second capacitor electrode comprising platinum (col.3, lines 33-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 44, 45, 46 & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (U.S. 6,338,970) in view of Eastep (U.S. 6,090,443).

Suh discloses substantially all of claimed invention, but do not disclose wherein the first layer has less crystalline than the second layer (cl.45); wherein the first layer is substantially amorphous and the second layer is substantially crystalline (cl.46); and wherein the perovskite-type material has a different chemical composition between the two layers (cl. 50); where.

-Re. claims 45, 46 & 50: Eastep in related art discloses multiplayer ferroelectrics, which include the first layer has less crystalline and amorphous than the second layer is substantially crystalline nuclei, as well as different chemical composition to the second layers (col.2, lines 25-61).

Art Unit: 2813

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Suh invention by incorporation the first layer has less crystalline, amorphous and different chemical composition than the second layers to obtain a well crystallized state at annealing.

Suh also do not disclose a range of the dielectric layers thick from 10 –50 and 50-500 Angstroms (cl.44).

-Re. claim 44: Eastep also discloses the first and second layer range thickness is from 50-500 Angstroms (col.2, lines 35-45).

The thickness of the dielectric layers are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, As noted In re Aller 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness, would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Claims 64 & 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (U.S. 6,338,970) further in view of Summerfelt et al. (U.S. 6,362,068B1).

Art Unit: 2813

Suh discloses substantially all of the claimed invention. However, Suh does not disclose the perovskite type dielectric material comprising lead zirconium titanate or lanthanum doped PZT (cls. 64 & 65).

-Re. claims 64 & 65: Summerfelt discloses a perovskite type material comprises PZT, lanthanum doped PZT through out the layers (col.1, lines 44-61);

It would have been obvious to one having skill in the art at the time the invention was made to modify Suh invention by incorporating the alternative using of perovskite type dielectric material comprises PZT, lanthanum doped PZT to control leakage current because they are high permittivity material.

Claims 47 & 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh (U.S. 6,338,970) further in view of Ren et al. (U.S. 6,507,060B2).

Suh discloses substantially all of the claimed invention, but so not disclose perovskite type dielectric material has a third dielectric layer approximate second electrode has the same crystalline amount/amorphous to the first dielectric layer (cl.47); and wherein the range of the dielectric layers thickness from 10 -500 Angstroms (cl.49).

-Re. claim 47: Ren et al. disclose a capacitor perovskite type dielectric material with 3 layers 108, 110 & 112, wherein the third layer 112 has a same crystalline amount as the first layer 108 (col.4, lines 7-31) .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Suh invention by incorporation third dielectric layer is in amorphous to obtain a well crystallized state at annealing.

Art Unit: 2813

-Re. claim 49: Ren et al. disclose the range of dielectric layers thick from .01-.10um and .15-2um (col.3, lines 19-60).

The thickness of the dielectric layers are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, As noted In re Aller 105 USPQ233, 255 (CCPA 1955), the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness, would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Response to Arguments

~~Applicant's arguments with respect to claims 43-47, 49-51, 53, 54 & 58-65 have~~
been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached 703-308-4940. The fax phone numbers for

Art Unit: 2813

the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Yennhu Huynh



Examiner

10/17/03